Ephemeris for Berlin Midnight.

1896.	R.A. h. m.		Decl. ° ′		Log Δ.		Br.
Nov. 10	...	20 9·6	...	+19 3	...	0·206	... 1·0
14	...	20 5·0	...	16 12	...	·219	... 1·0
18	...	20 1·3	...	13 34	...	·233	... 1·0
22	...	19 58·2	...	11 9	...	·246	... 0·9
26	...	19 55·9	...	8 55	...	·259	... 0·9

Prof. Holden has also communicated elements calculated from observations made on November 2, 3, and 4. These are somewhat different from those given above, but the computed position for November 18 is not far from that given in the above ephemeris, being R.A. 20h. 1·8s., Decl. 13° 57′.

On the 10th the comet was nearly in a straight line, joining δ and γ Sagittæ, being about as far from γ as δ is, only on the opposite side. The motion in declination is in the direction of α Aquilæ, near which star the comet will be found on the 26th.

THE LEONIDS.—In a preceding number of NATURE (vol. liv. p. 623), Mr. Denning gave full information for those wishing to observe this star shower with the naked eye, but, curiously enough, he did not mention the great advantage photography would afford us in obtaining a very accurate determination of the radiant point. One can quite understand that, by placing a small camera on a telescope equatorially mounted, and employing a wide angle lens oriented towards the radiant point, a large space in the sky can be included on the plate sufficient to catch many of the streaks if they be at all numerous. The plates can be changed every thirty minutes or so. It was the intention of the writer of this note, some fourteen days ago, to adopt this principle, and he has already been able to get the necessary apparatus ready. The use of a wide angle lens necessitates that, if an equatorial be used, the camera must be placed at the extreme end (object-glass end) of the telescope, otherwise the opening in the shutters will cut off some of the field, and in consequence neutralise to some extent the value of the wide angle. This was found to be so; but, by the kindness of Mr. J. Norman Lockyer, a siderostat was placed at his disposal. The instrument not having yet been set up since its return from the eclipse expedition, it was erected temporarily in a good position open towards the eastward.

Captain Abney has very generously lent a Cooke's lens, invented by Mr. Dennis Taylor, giving a field of about 75° and of about five inches focal length, so that only now fine weather is required.

It may be mentioned that the current (November) number of *The Observatory* contains an interesting article by Dr. Johnstone Stoney on the "Leonids," in which he quotes an extract from a letter received from General Tennant, who advises practically the same method described above. The appendix to this article contains a reference to the literature on the subject of the Leonids, from which we make the following summary.

Prof. H. A. Newton, *Silliman's Journal*, 1864, vols. xxxvii. and xxxviii. pp. 377 and 53 respectively. Prof. Adams, *Comptes rendus*, March 25, 1867, p. 651, and *Monthly Notices R.A.S.*, April 1867, p. 247. Signor Schiaparelli, *Les Mondes*, December 1866, and beginning of 1867. English outline of Schiaparelli's work, by Prof. Newton, *Philosophical Magazine* for July 1867, p. 34. M. Le Verrier, *Comptes rendus*, January 21, 1867, p. 94. Dr. Johnstone Stoney, *Monthly Notices R.A.S.*, June 1867, p. 271, and *Philosophical Magazine*, September 1867, p. 188.

SUNSPOTS, COMETS, AND CLIMATE VARIATIONS.—A problem of considerable interest is suggested by the paper which Herrn Johannes Unterweger contributes to vol. lxiv. of the *Denkschriften der Math. Natur. Wissen. Classe der Kais. Akad. der Wiss.* of Vienna. The pamphlet, which has been printed separately, is entitled, "Ueber zwei Trigonometrische Reihen für Sonnenflecken, Kometen und Klimatschwankungen," and contains a preliminary statement of the investigation in question. The main result of the work is that there seems to be found a striking similarity between the variations of a certain function obtained from periodic comets near perihelion and the curves illustrating sunspot and climate variations. This function is obtained from a formula (see *Denkschriften Kais. Akad. Wien.*, vol. lix.) that he has previously published, which gives a relationship between the function and the inclinations and perihelion distances of well-observed periodic comets. The comets dealt with are divided into two groups, according as their perihelia lie to the north or south of the solar equator, and the mean of those which pass through their perihelia during each year is taken. The author then finds two trigonometrical series which represent the periods of both sunspot frequency and the variations of this cometary function, the former of which includes a secular variation of about 70 years, while the latter indicates a 35-year variation corresponding with that due to climate variations. In the curves shown, Herrn Unterweger indicates a variation in the minima as well as in the maxima in the case of the calculated frequency of sunspots, the former of which does not really occur as observation shows. The investigation is, however, full of interest, and perhaps the more detailed discussion which he promises will throw more light on this question.

THE EXPLOSIVE PROPERTIES OF ACETYLENE.

IN view of attempts to extend the use of acetylene as an illuminant, the disastrous explosion in Paris, to which reference was made in our issue of October 22, has created a good deal of anxiety in this country. In this connection it may interest our readers to have a further account of the memoir on the explosive properties of acetylene recently presented to the French Academy by MM. Berthelot and Vieille (see NATURE, vol. liv. p. 591).

The authors state that in acetylene at ordinary pressures neither an electric spark, nor a flame, nor an explosion of fulminate will cause more than a local dissociation of the gas (a fact already established by Prof. H. B. Dixon), but that if the gas be compressed beyond two atmospheres, the dissociation, once started, is propagated without sensible diminution throughout the whole mass of gas. In this way dissociation of the gas was effected in a tube 20 millimetres in diameter and 4 metres long. The acetylene splits up into pure hydrogen and a friable mass of carbon, which forms a cast of the containing vessel, and can be withdrawn intact. At a pressure of 20 atmospheres, which is about half the tension of the saturated vapour of liquid acetylene at 20° C., the explosion develops a tenfold pressure, but the rate of propagation is much below that of true explosive wave of such a mixture as electrolytic gas. The temperature due to the explosion at this pressure is calculated to be 2750° C. As the violence of the explosion increases with increasing initial compression, it was to be expected that liquid acetylene would exhibit the character of a "high" explosive. This MM. Berthelot and Vieille have shown to be the case. Eighteen grammes of liquid acetylene exploded in a steel bomb of 49 c.c. capacity by a hot wire developed a pressure of 5564 kilogrammes per square centimetre. This corresponds to an explosion pressure for the liquid alone of about 9500 atmospheres—a value approaching that of guncotton. The decomposition of liquid acetylene by simple ignition is relatively slow, and appears to take place in two stages, one corresponding to the decomposition of the gas, the other that of the liquid. In an experiment where the liquid occupied ·15 of the containing vessel, a maximum pressure of 1500 kilogrammes per square centimetre was recorded.

Experiments were made to determine whether the compressed gas or liquid could be exploded by mechanical shock. The results were, strictly speaking, negative. Neither by fall, nor crushing with a ram, nor by the impact of a bullet which pierced the containing cylinder, was the acetylene exploded. In the case of liquid acetylene, an explosion followed the shock after a short interval, but this was shown to be due to the ignition of the escaping gas, after admixture with air, by a spark from the breaking metal. A small charge of fulminate of mercury fired in the middle of a cylinder of liquid acetylene detonated the liquid, and shattered the cylinder in the manner of a true explosive.

The authors describe the conditions under which danger may arise by casual elevation of temperature during the manipulation of acetylene. In the first place they note that in generating acetylene by the action of a small quantity of water or excess of calcium carbide in a closed vessel, the carbide may become incandescent and lead to the detonation of the gas. At least one accident due to this cause has already been recorded. Sudden compression of the gas in filling cylinders, or in admitting it into a reducing valve, may likewise raise the temperature to the point of danger. A sharp mechanical shock breaking the containing vessel may cause sparks capable of firing the explosive mixture formed by the escaping gas with the external air.

In conclusion MM. Berthelot and Vieille express their opinion

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that the dangers of acetylene are not such as to outweigh its advantages as an illuminant. They add that by simple precautions, such as the slow transference of the compressed gas from vessel to vessel, and the careful cooling of the vessels in which the gas is being compressed, the dangers which they have explained may be easily avoided.

The comfort afforded by these concluding remarks is somewhat abated by the fact that the explosion at M. Pictet's factory was subsequent to the publication of MM. Berthelot and Vieille's memoir. There is no occasion for panic, but the matter evidently demands the most careful attention from the authorities in this as well as in other countries. A. Smithells.

THE PRINCETON SESQUICENTENNIAL.

THE celebration of the one hundred and fiftieth anniversary of the founding of Princeton University, held October 20-22, was doubtless, in some respects, the most brilliant and impressive academic event in all American history. Certainly no other celebration can be compared with it than the Harvard Quarter Millennial of 1888. Most of the leading universities, and many of the smaller universities of America, sent their president; Harvard, Cornell, Columbia, Chicago, Johns Hopkins, Pennsylvania, and Toronto were thus represented. Of the great universities in the United States, Yale alone sent a delegate other than the President, who is now abroad.

The visiting delegates from Europe delivered a series of lectures the week before the anniversary exercises. Prof. Edward Dowden, of Dublin, gave six lectures on "The French Revolution and English Literature"; Prof. Felix Klein, of Göttingen, gave four lectures on "The Mathematical Theory of the Top"; Prof. J. J. Thomson, of Cambridge, four on "The Discharge of Electricity in Gases"; Prof. Andrew Seth, of Edinburgh, gave two on "Theism"; and single lectures were delivered by Prof. Carl Brugmann, of Leipzig, on "The Nature and Origin of the Noun Genders in the Indogermanic Languages"; and Prof. A. A. W. Hubrecht, of Utrecht, on "The Descent of the Primates." Among other foreign delegates were Prof. Henri Moissan, of Paris, Demetrius Botassi, of Athens, and Goldwin Smith, late of Oxford.

Among the proceedings was the unveiling of a table in Nassau Hall, commemorative of the change of name of the University from that of the "College of New Jersey," which has always been its official designation, to "Princeton University," which has already long been its popular designation.

Gifts, amounting to 1,350,000 dollars, have been contributed in honour of the Sesquicentennial, and to mark the change in the Institution's title.

The honorary degree of LL.D. was conferred upon the following delegates, among others:—Wilhelm Dörpfeld, First Secretary of the German Archæological Institute, Athens, Greece; A. A. W. Hubrecht, Professor of Zoology in the University of Utrecht; Felix Klein, Professor of Mathematics in the University of Göttingen; Henri Moissan, Professor of Chemistry in the University of Paris, and Member of the French Academy of Sciences; Edward Baynall Poulton, Hope Professor of Zoology in the University of Oxford; Joseph John Thomson, Cavendish Professor of Physics in the University of Cambridge; J. Willard Gibbs, Professor of Mathematical Physics in Yale University, New Haven, Ct.; Daniel Coit Gilman, President of the Johns Hopkins University, Baltimore, Md.; George Lincoln Goodale, Fisher Professor of Natural History, and Director of the Botanical Garden in Harvard University, Cambridge, Mass.; George William Hill, Member of the National Academy of Sciences, Foreign Associate of the Royal Astronomical Society, West Nyack, N.Y.; William James, Professor of Psychology in Harvard University, Cambridge, Mass.; S. P. Langley, Secretary of the Smithsonian Institution, Washington, D.C.; Joseph LeConte, Professor of Geology and Natural History in the University of California, and President of the American Geological Society, Berkeley, California; John W. Mallet, Professor of Chemistry in the University of Virginia, Charlottesville, Virginia; Silas Weir Mitchell, Philadelphia, Pa.; Simon Newcomb, Nautical Almanac, Navy Department, Washington, D.C.; William Peterson, Principal of McGill University, and Professor of Classics, Montreal, Canada; Ira Remsen, Professor of Chemistry, and Director of the Chemical Laboratory in the Johns Hopkins University, Baltimore, Md.; Henry A. Rowland, Professor of Physics, and Director of the Physical Laboratory in the Johns Hopkins University. The degree was also conferred upon Lord Kelvin and Prof. Otto Struve *in absentia*.

One of the most pleasing and hopeful features of the Princeton celebration was the note of peace and good will to all mankind, which such international gatherings powerfully promote. The first sentiment which called out applause was the hope expressed by President Patton in his opening sermon, that the peace and harmony now happily existing between the two great English-speaking nations might henceforth nevermore be broken; and when in the afternoon of the same day Prof. Thomson, of Cambridge, at the reception of delegates, said that he was glad the revolutionary war had resulted in independence of the United States, as he considered that the best solution of the question, and that England, as well as America, now rejoiced in this outcome of the struggle, the applause was unstinted. Wm. H. Hale.

THE OPENING CEREMONY OF THE GATTY MARINE LABORATORY, UNIVERSITY OF ST. ANDREWS.

THE formal opening of the Gatty Marine Laboratory, the general arrangement of which has been already described in Nature, took place on Friday, October 30, by Lord Reay, a former Rector of the University, in the presence of the Principal and Professors, the representatives of various scientific societies, universities, and colleges, and a distinguished company. In his address Lord Reay paid a tribute to Dr. Gatty for his discriminating generosity. He observed that in countries such as France money was more readily forthcoming for science. He spoke in warm praise of the labours of the late Lord Dalhousie in the cause of the fisheries, and pointed out how important scientific knowledge was in regard to fisheries legislation. Moreover, that whatever revelations science has in store for us cannot be evaded. He was inclined to think that a few central institutions thoroughly well equipped, were better than many incomplete and inefficient schools. The work in the Gatty Marine Laboratory would be of a purely scientific character, but it would be of the utmost value to all who were interested in the prosperity of our fisheries. A glance at the papers published since the opening of the old Laboratory in 1884, showed how essential their contents were for those who wish to protect our fisheries, and who often attempt it in the wrong way. He drew attention to the unique position of the University in regard to the study of marine biology.

Prof. Sir William Flower then followed, and he traced the growth of the study of marine animals during the last fifty years. In former days the zoologist had to depend on the rock-pools, or specimens stranded by storms, or had to work on board ship. Especially he pointed out the development of aquaria from their simplest form to the present great tanks. He then adverted to the growth of zoological stations over the world, and considered that St. Andrews, by its work, had come to be a centre for the study of problems connected with the fisheries. Its laboratory was the first that was fairly established in the British Isles; and while he knew that Edinburgh was often called the Athens of the North, he would now say that St. Andrews had many claims to be called the Naples of the North.

The Dean of the Faculty of Arts then presented the following gentlemen for the degree of LL.D.:—Prof. Sir William Flower, K.C.B., F.R.S.; Rev. Dr. Henry B. Tristram, F.R.S.; Prof. Michael Foster, Sec.R.S.; and Prof. Gustave Gilson, Louvain.

Dr. C. H. Gatty then expressed his gratification at the interest taken in the new Laboratory, and handed to Lord Reay a silver key wherewith to open the door.

Prof. McIntosh, on behalf of the University and the scientific workers, conveyed their thanks to Dr. Gatty for his munificent gift.

Thereafter the Laboratory was inspected by the company. In addition to the living animals in the tanks, the walls of the lobby were hung with coloured drawings of marine animals—enlarged to various degrees, and many beautifully and softly painted—all by the late Mrs. Günther. These drawings consisted almost entirely of representations of living forms from St. Andrews

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